Need a Low-Power, High-Accuracy Instrumentation Amplifier with On-Chip Calibration for Enhanced Performance?

Microchip announced its first instrumentation amplifier, the MCP6N11. The new instrumentation amp features Microchip’s unique mCal technology, which is an on-chip calibration circuit that enables low initial offset voltage and a means to control offset drift, which results in higher accuracy across time and temperature. The MCP6N11’s low-power CMOS process technology enables low power, while providing a gain bandwidth product of 500 kHz, and it features a hardware shutdown pin for even more power savings. The device’s low, 1.8V operation allows two 1.5V batteries to be drained beyond typical use, and its rail-to-rail input and output operation enables full-range use, even in low-supply conditions. The MCP6N11 instrumentation amp is ideal for applications in the consumer, industrial and medical markets, such as in signal and sensor conditioning, and instrumentation.

Many applications in these markets require high-accuracy, low-power and low-voltage performance, and the MCP6N11 meets those needs. The device’s mCal technology provides a highly accurate way to minimize drift over time and temperature. Additionally, the device’s low-power operation/shutdown requires less current for the given speed and performance, which extends battery life and leads to less self-heating. The MCP6N11’s low-voltage operation, with rail-to-rail input and output, enables a greater dynamic range, which improves performance across the entire operating-voltage range. This device provides an innovative solution for signal-conditioning applications that require great performance at a competitive price point. The use of mCal technology within this product demonstrates Microchip’s commitment to innovation, and provides a distinct competitive advantage for our customers.

The MCP6N11 instrumentation amp is supported by Microchip’s MCP6N11 Wheatstone Bridge Reference Design (part # ARD00354). The MCP6N11 CMOS Instrumentation Amplifier is available in an 8-pin SOIC package and an 8-pin 2x3 mm TDFN package.

Learn more about the MCP6N11, visit: http://www.microchip.com/mcp6n11
Microchip Introduces Smallest, Lowest-Cost PIC32 Microcontrollers

Feature-Packed 32-bit Microcontrollers Include I²S Interface for Audio Playback Applications; Plus Capacitive Touch, USB 2.0 and Digital Pin Remapping

Microchip announced a new series of low pin count 32-bit PIC32 microcontrollers (MCUs) that provide 61 DMIPS of performance in packages as small as 5x5 mm for space-constrained and cost-sensitive designs. The PIC32 “MX1” and “MX2” MCUs are the smallest and lowest-cost PIC32 microcontrollers, and are the first PIC32 MCUs to feature dedicated audio and capacitive-sensing peripherals. These new MCUs include a host of additional useful features that make them suitable for applications in the consumer, industrial, medical and automotive markets.

Rated for operation up to 105°C, the PIC32 MX1 and MX2 MCUs include up to 32 KB of Flash, and 8 KB of SRAM; two I²S interfaces for audio processing; Microchip’s Charge Time Measurement Unit (CTMU) peripheral for adding mTouch™ capacitive touch buttons or advanced sensors; and an 8-bit Parallel Master Port (PMP) interface for graphics or external memory. The new devices also feature an on-chip 10-bit, 1 Msps, 13-channel Analog-to-Digital Converter (ADC), as well as USB 2.0 and serial-communications peripherals.

The MCUs bring eight new packages to the PIC32 MCU product line, from 28- to 44-pins, with sizes down to 5x5x0.5 mm. Further easing the design effort is Microchip’s Peripheral Pin Select (PPS) feature, which allows developers to “remap” most digital-function pins in the chip, making layout and design modifications significantly simpler. The PIC32 MX1 and MX2 devices are compatible with Microchip’s 16-bit PIC24F product line for easy migration, and are supported by the MPLAB® X IDE – the single development environment for all of Microchip’s 8-, 16- and 32-bit MCUs.

More designs in the consumer, industrial, medical and other markets are requiring high-quality audio, touch-sensing and graphics capabilities, as well as USB communication. With their numerous on-chip peripherals and features in small packages, the PIC32 MX1 and MX2 enable designers to add all of this functionality, while keeping design size and costs low.

Microchip also unveiled the MPLAB Starter Kit for PIC32MX1XX/2XX MCUs (part # DM320013), today. The USB-powered kit features a PIC32MX220F032 with 32 KB of Flash and 8 KB RAM, as well as a 2” color TFT display (220 x 176 pixel), capacitive-touch slider and buttons, SD-card storage and 24-bit audio playback. Additionally, the new PIC32MX CTMU Evaluation Board (part # AC323027) is available, as well as the new PIC32MX220F032D Plug-In Module (part # MA320011) for the Explorer 16 Development Board.

The PIC32MX110F016B and PIC32MX220F032 MCUs are available in 28-pin SPDIP, SSOP, SOIC and QFN packages; and in 44-pin QFN, VTLA and TQFP packages. A 36-pin VTLA package option with a .5 mm pin pitch is available for limited sampling, today. Industrial temperature range products with operation up to 85°C are available today, with 105°C options expected in late CQ4 2011.

To learn more about the PIC32 “MX1” and “MX2”, visit:
Microchip offers designers a one stop solution for developing diverse wireless applications. Join technical experts from Microchip and Avnet Memec for a three-hour technical seminar that will educate attendees about Microchip’s wireless solutions and will demonstrate just how easy it is to add wireless functionality to a design using Microchip pre-certified modules.

**AGENDA**

**Data Converter Basics and Architectures**
- Wireless in embedded applications
- Different wireless technologies and radio frequencies
- Advantages of modules

**Embedded WiFi Overview**
- WiFi priorities in embedded applications (low power, form factor, MCU compatibility)

**MiWi Networking Protocol Overview**
- Leveraging key features such as Mesh networking in your end application

**MiWi Networking Protocol Demo**
- Evaluating the MiWi protocol using the MiWi card demos

**Embedded WiFi Demo**
- Evaluating Microchip’s WiFi module using the WiFi card demos

**Blueprint for Getting Started**

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**EVENT DETAILS**
- Each event will be ~3 hours (See website for start and end times)
- Continental breakfast and lunch will be served.
- **Cost: No Charge**
- Attendees will receive a discount coupon for Microchip wireless development tools.

**COMING TO A CITY NEAR YOU!**

<table>
<thead>
<tr>
<th>City</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detroit</td>
<td>Nov-29</td>
</tr>
<tr>
<td>Grand Rapids</td>
<td>Nov-30</td>
</tr>
</tbody>
</table>

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Learn more about Microchip’s Wireless Technical Seminars, visit:
http://www.em.avnet.com/microchipwireless

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**Save 20% on Energy Harvesting Kits! Offer Ends 12/1/11**

20% off the Powercast Energy Harvesting Development Kit for Wireless Sensors with Code TPXH9K2
The Lifetime Power® Energy Harvesting Development Kit for Wireless Sensors enables the development of battery-free wireless sensor applications using RF energy as the power source and Microchip’s PIC® MCU with nanoWatt XLP Technology. Powercast’s P2110 Power Harvester Receiver converts RF energy into DC micro-power, and provides a regulated output voltage to a wireless sensor node.

**Contents of the kit include:**
- 1 - 915 MHz Powercaster Transmitter (TX91501-03-ID)
- 2 - P2110 evaluation boards with two antennas and expansion connector (P2110-EVB)
- 2 - Wireless sensor modules preloaded with operating software
- 1 - **Microchip XLP 16-bit Development Board (DM240311)** with USB cable, pre-loaded with access point software
- 1 - **Microchip MRF24J40MA PICtail™ Daughter Board (AC164134-1)** - 802.15.4, 2.4 GHz radio module
- 1 - **Microchip PICkit™ 3 Programmer with USB Cable (PG164130)**

**Buy Now!**
Microchip Announces Wider Temperature-Range Qualification for 32-bit PIC32 Microcontrollers

PIC32 Microcontrollers Now Operate From -40°C to +105°C, Enabling Use in a Wide Range of Robust Applications

Microchip announced that the 32-bit PIC32 microcontrollers (MCUs) now operate from -40°C to +105°C, enabling their use in a wide range of robust applications. Examples include applications in the communications, industrial, medical, automotive, appliance and renewable-energy market spaces, among others. The newly qualified V-Temp MCUs continue to provide the wide variety of features for which the PIC32 MCUs are known – including peripherals for connectivity, graphics, audio, touch sensing and industrial CAN – bringing the most capable and cost-effective solutions to these targeted markets.

Many applications in the aforementioned markets must operate at higher temperatures of up to 105°C. With their new, wider temperature-range qualification, designated as V-Temp, the PIC32 MCUs give designers the flexibility to add the features and functionality that will help differentiate their products in the marketplace, while maintaining the ability to operate under extreme temperatures. Further, the MCUs provide full access to up to 128 KB RAM for simultaneous use with the Ethernet, USB and CAN buffers; and the on-chip Ethernet, industrial CAN and USB modules have a built-in DMA interface to maximize data throughput.

With industry-leading performance and now a wider temperature-range qualification, the PIC32 MCUs enable Microchip’s customers to design applications that need higher temperature tolerance with an exceptional price/performance combination.

To evaluate the advanced features of the newly qualified PIC32 V-Temp MCUs, customers can use Microchip’s complete PIC32 MCU tool suite. This includes low-cost starter kits; full-featured development and expansion boards; PICtail™ daughter boards and Plug-In Modules; as well as debuggers, the MPLAB® IDE and MPLAB C compilers.

The newly V-Temp qualified PIC32MX3/4/5/6/7 MCUs are available in 64-pin QFN and TQFP packages, as well as 121-pin TFBGA and 100-pin TQFP packages. Additionally, the recently introduced PIC32 MX1/2 MCUs are also being extended to the V-Temp range, and are expected to be qualified in late CQ4 in 28-pin QFN, SOIC and SSOP packages, as well as 44-pin QFN, TQFP and TLA packages.
Need Parallel Flash Memory in an Ultra-Compact Package?
Compact, Low-Power Devices Meet Demanding NOR Flash Market Requirements

Microchip announced an expansion of its Multi-Purpose Flash Plus (MPF+) memory portfolio, with the introduction of the **SST39VF80XC** and **SST39VF160XC**. The SST39VF80XC offers 8 Mbit of memory, while the SST39VF160XC offers 16 Mbit of memory. Manufactured with high-performance CMOS SuperFlash® technology, these low-power, 3V, x16 parallel NOR Flash devices feature active current as low as 5 mA (typical) and standby current of 3 microamperes (typical). Besides offering exceptional reliability, these devices feature fixed program and erase times that do not deteriorate over time. The SST39VF80XC offers fast, 7 microseconds program time (typical) and access times of 55 ns and 70 ns.

Both devices offer industry-compatible command sets, and are ideal for use in applications such as consumer electronics (e.g. Bluetooth® headsets, camera modules and gaming peripherals), automotive (e.g. car infotainment) and industrial (e.g. printers, alarms and meters). For applications that require reliable, low-power memory in compact packages, these new MPF+ devices are also available in an ultra-compact, 4x6 mm, 48-pin WFBGA package, which is the industry’s smallest footprint for packaged devices, in these densities.

These new MPF+ products demonstrate Microchip’s commitment to expanding it’s NOR Flash portfolio. These devices give customers the small size, low power consumption and high performance NOR Flash they require for their applications.

The SST39VF80XC comes in a 6x8 mm 48-pin BGA package. The device is also available in 4x6 mm 48-pin WFBGA and 12x20 mm 48-pin TSOP packages. The SST39VF160XC comes in a 6x8 mm 48-pin BGA package. The device is also available in 4x6 mm 48-pin WFBGA and 12x20 mm 48-pin TSOP packages.

Utility Metering Solutions

The metering market is facing many challenges in today’s rapidly evolving world. Government regulations, competitive forces, technology innovations and end customer expectations are fueling unprecedented changes in this market. Having a “smart” partner who can help you stay current and allow you to react quickly will be the difference between success and failure.

With today’s meter designs, innovation rests in many areas – some driven by migrations from mechanical meters to first-time electronic intelligence, while others are driven by the advanced intelligence and two-way communications of smart meters and the demands of tomorrow’s smart grids. Microchip understands the design challenges facing meter designers, whether it’s increasing meter accuracy and reliability while lowering total system cost or engaging the end customer in their home as part of the home area network. Our solutions are used in millions of meters worldwide, Microchip wants to be a partner in your success, not just a vendor.

Microchip offers a complete portfolio of 8-, 16- and 32-bit microcontrollers, 16-bit digital signal controllers, energy measurement integrated circuits (ICs), analog components, Flash memory and serial EEPROMs.

**Click here to read Microchip’s Complete Utility Metering Solutions Brochure**
Microchip and Digilent® Announce Embedded Motor Control Cerebot™ MC7 Development Kit for Academia and Hobbyists

Kit is Ideal for Academic and Hobbyist Embedded Motor-Control Applications

Microchip Technology Inc. and Digilent®, Inc., announced the availability of a Microchip dsPIC33 Digital Signal Controller (DSC)-based development kit. The Digilent® Cerebot™ MC7 Development Kit addresses the growing interest in embedded motor control from the academic and hobbyist markets, and is ideal for learning about microcontrollers and solving real problems. The kit includes a demonstration board that provides four half-bridge circuits, eight RC servo motor connectors, the ability to use Digilent Pmod™ peripheral modules, and an integrated programming/debugging circuit that is compatible with the free MPLAB® IDE. Example applications include university embedded-systems and communications classes, senior capstone projects, and numerous other academic and hobbyist projects.

The Cerebot MC7 board features four half-bridge circuits that are rated for 24V at up to 5A. These half bridges can be used to control two Brushed DC motors, two bi-polar stepper motors, one Brushless DC motor and one uni-polar stepper motor. An onboard 5V, 4A switching regulator with an input voltage up to 24V simplifies operation of the board, enabling it to operate from a single power supply in embedded applications such as robotics. The onboard dsPIC33 DSC features 128 KB internal Flash program memory and 16 KB internal SRAM, as well as numerous on-chip peripherals, including an advanced 8-channel motor-control PWM unit, an enhanced CAN controller, two Serial Peripheral Interfaces (SPIs), timer/counters, serial-interface controllers, an Analog-to-Digital Converter (ADC), and more. The Cerebot MC7 board combines two push buttons and four LEDs for user I/O, as well as connections for two I²C™ busses, one of which contains an integrated serial EEPROM device.

“The Cerebot MC7 board is an ideal embedded motor control and general-purpose microcontroller experimentation platform for academics and hobbyists,” said Clint Cole, president of Digilent Inc. “It’s our latest entry in the engineering education market.”

Microchip continues to see an interest in advanced robotic applications in the academic and hobbyist markets. The Cerebot MC7 board is ideal for these types of applications, among many others requiring the advanced motor-control peripherals found on Microchip’s industry-leading dsPIC33 DSCs.

For development support, the free version of Microchip’s MPLAB IDE can be downloaded today. The MPLAB C Compiler for dsPIC® DSCs can be downloaded today.

The Cerebot MC7 Development Kit is available today. It can be purchased from Digilent or from microchipDIRECT (part # TDGL007).

About Digilent Inc.

Digilent Inc. is a leader in providing academic and research solutions in high end electronics fields. Their headquarters are in Pullman Washington, with offices in Taiwan, China and Romania. Currently, over 1000 universities, training centers and research laboratories in more than 70 countries use Digilent products and services. For more information, please visit the Digilent Web site.

To learn more about Microchip’s Academic Program, visit: http://www.microchip.com/stellent/idcplg?IdcService=SS_GET_PAGE&nodeId=1440
Save More with Microchip


Microchip continues to introduce a wide range of innovative 8-bit products targeted at low power consumption, enabling designs with reduced component count, reductions in cost and board space and integration of enhanced features.

Save More Power With Low Active and Sleep Currents!

With each new generation of 8-bit products, Microchip has reduced quiescent current levels significantly. Microchip plans to continue doing so as evidenced by a number of recently released product families. These new products are the lowest power, lowest pin count devices with industry leading active current as low as 30 µA and sleep current for all products below 100 nA and some as low as 20 nA.

Save More Space With Small Package Options!

The miniaturization of electronic devices has gone mainstream and Microchip intends to stay ahead of the trend. For starters, Microchip has introduced Ultra Thin QFN (UQFN) packaging across our lineup. Not only are these new packages 50% thinner than the existing QFNs, they are smaller in every dimension. The UQFNs offer a very cost-effective method for reducing board size. A number of different packaging options are available in various pin counts:

- 64-pin, 9x9x0.9 mm (QFN)
- 40-pin, 5x5x0.5 mm (UQFN)
- 28-pin, 4x4x0.5 mm (UQFN)
- 14-pin, 3x3x0.9 mm (QFN)
- 6-pin, 2x3x0.9 mm (DFN)
- 6-pin, 1.6x2.9x1.2 mm (SOT-23)

Save More Money With Integrated Peripherals!

PIC® microcontrollers (MCUs) are often viewed as the most useful MCUs in the industry. This is due in no small part to the high levels of peripheral integration present in every product. These peripherals allow our customers to implement much of their system’s functionality into a single MCU saving on board space.

Several newly integrated peripherals have been introduced, including:

- **Configurable Logic Cell (CLC)** – Provides up to 16 different inputs for combinational and sequential logic (Boolean functions, Flip-flops, Latches) that is configurable under software control. A CLC Configuration Tool is available to streamline the setup process of the CLC module by simulating the functionality of the registers in a Graphical User Interface (GUI).

- **Numerically Controlled Oscillator (NCO)** – Dedicated 16-bit PWM that can be used for applications within lighting and power supplies.

- **Complementary Waveform Generator (CWG)** – Provides a complementary waveform with rising and falling edge dead band control, with auto-shutdown capability that provides improved switching efficiencies for applications such as synchronous power supplies and motor control.

- **Charge Time Measurement Unit (CTMU)** – Integrated constant current source that can be used with the ADC for capacitive, inductive or resistive, or precise time measurements and is extremely helpful in advanced sensing applications, reducing the need for external components and CPU overhead.

- **Real-Time Clock Calendar (RTCC)** – Maintains accurate time, date, day of week and year information for extended periods of time.

To learn more about Saving More with Microchip, visit: http://www.microchip.com/8bit
Operational Amplifiers Versus Instrumentation Amplifiers: What’s the Difference?

In the past, the term instrumentation amplifier has been confused, referring to the application rather than the architecture of the device. Historically, any amplifier that was considered precision (implemented some sort of input offset correction) was thought to be an “instrumentation amplifier” since it was designed for use in measurement systems. Instrumentation amplifiers, or INAs, are related to op amps, in that they are based on the same basic building blocks, but an INA is a specialized version of an op amp.

The most notable difference in terms of use is the lack of a feedback loop. As you may recall, op amps can be configured for inverting gains, non-inverting gains, voltage followers, integrators, filters, etc. In all cases, the user is providing a feedback loop, and that feedback loop determines the function of the amplifier circuit. An INA has this feedback internally, so there isn’t an external feedback to the input pins. INAs are specifically designed and used for their differential gain and common mode rejection capabilities.

The first question one may have is, “Can’t I build an instrumentation amplifier out of simple op amps?” The short answer is yes, you can. But there are always trade-offs! One may first think of a simple difference amp circuit (Figure 1), sometimes called a subtractor. This is a very simple circuit that provides for differential gain and has some common mode rejection, which is exactly what an INA is intended to do. Earlier I mentioned trade-offs, and this circuit has a couple. First of all, let’s look at the input impedance. It is relatively low, determined by the values of the resistors, which may be on the order of 100 kΩ. Secondly, the input impedances aren’t matched, meaning a different current will flow through each leg, causing your common mode rejection to suffer. The other shortcoming of this simple circuit is the need for resistor matching. Any mismatch in these resistor pairs will again reduce the Common Mode rejection.

You may have seen the popular “3 op amp” instrumentation amplifier, shown in Figure 2. This offers some significant improvements over the simple differential amp circuit. The buffers on the front end provide a high impedance, well matched impedance source. The differential amp at the end provides the same rejection of common mode as the difference amp previously discussed. One still has the issue with resistor matching, and this requires three op amps (not to mention some passives), so this isn’t saving much in terms of cost relative to a monolithic INA.

Microchip recently introduced its first INA, the MCP6N11. This single instrumentation amplifier is available in two package offerings, 8-pin SOIC and 2x3 TDFN. The use of mCal technology, which is an on-board digital self-calibration, provides for low offset and low offset drift (by allowing the user to re-calibrate the amplifier via the CAL pin). The MCP6N11 provides 500 kHz of bandwidth, operates rail-to-rail on the input and output and supports an operating voltage range from 1.8V to 5.5V.

To achieve similar performance by implementing a 3 op amp INA, one could use the MCP6064 quad op amp, which has EPROM trimming for low offset. However, the common mode rejection would not be as good as the MCP6N11 due to the limitations in resistor matching. With a slightly higher per unit price for the MCP6064, the MCP6N11 is also more cost effective. In this example, the monolithic INA provides a higher performance, smaller solution at a lower price point. A win-win-win for any application!

For more information on Microchip’s Op Amp portfolio, visit: http://www.microchip.com/opamp
Code metrics are often used to assist software project management. The CCS C Compiler IDE (SW500024) measures and calculates the most common metrics used to evaluate source code, including Halstead’s complexity metrics, Cyclomatic Complexity, and the Maintainability Index. Software project managers can use these to identify problems in source code and to determine testing procedures. Code metrics can speed up the decision making process, and provide justification for software decisions to non-technical management.

The Halstead metrics were developed by Maurice H. Halstead and are derived from the unique and total number of operators and operands in the program. Halstead based his metrics in psychology and how the human brain is able to keep track of what makes up the total program. The CCS compiler calculates the Volume and Difficulty metric for each function and for the whole program. To understand these metrics, consider the following examples:

<table>
<thead>
<tr>
<th>Higher volume, lower difficulty</th>
<th>Lower volume, higher difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+=X;</td>
<td>A=B<em>C+B</em>A-B/D-B/C;</td>
</tr>
<tr>
<td>B+=X;</td>
<td></td>
</tr>
<tr>
<td>C+=X;</td>
<td></td>
</tr>
<tr>
<td>D+=X;</td>
<td></td>
</tr>
<tr>
<td>E+=X;</td>
<td></td>
</tr>
<tr>
<td>F+=X;</td>
<td></td>
</tr>
<tr>
<td>G+=X;</td>
<td></td>
</tr>
<tr>
<td>H+=X;</td>
<td></td>
</tr>
</tbody>
</table>

Both Volume and Difficulty are combined to estimate the level of effort required to implement. Metrics for the above examples would look like:

<table>
<thead>
<tr>
<th>Volume</th>
<th>Difficulty</th>
<th>Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>156</td>
<td>1.9</td>
<td>296</td>
</tr>
</tbody>
</table>

To properly account for the complexity of control statement nesting, the CCS compiler uses the Cyclomatic Complexity metric developed by Thomas J. McCabe. In short, it measures the number of possible paths through the code. A simple IF statement has two paths, while IF..ELSE..IF results in four paths. The number of possible paths directly correlates to the number of test cases required to fully test a program.

Using the above metrics, along with a simple count of source lines and the number of comments, the following additional useful metrics are calculated:

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to implement</td>
<td>Total hours/minutes to implement</td>
</tr>
<tr>
<td>Bugs</td>
<td>Estimated number of bugs in initial delivery</td>
</tr>
<tr>
<td>Maintainability Index</td>
<td>A measure of software maintainability</td>
</tr>
</tbody>
</table>

The Maintainability Index (MI) was developed at the University of Idaho. Values can range from 171 (very good) to an unbounded negative number (very bad). The interpretation of this metric can vary, but programs with a large negative MI should be avoided.

The code metric tools provided by the CCS IDE can be used to identify problematic functions, judge the quality of code, and improve testing procedures. They provide well known measures of program complexity, size and maintainability, and can be used to manage software projects more effectively.

For more information about CCS, visit: http://ccsinfo.com/
Demmel named Microchip’s first mTouch Design Partner Specialist in Europe

The label for reliable and premium mTouch products: Demmel High Quality HMI Solutions with unique metal surfaces and illuminated symbols.

Based on Microchip's mTouch principal, Demmel is offering complete customized capacitive control panels and keypads. The touch surface material depends on design requirements and can be almost any kind of plastic, glass or metal.

For high quality products, the most frequently asked material is either stainless steel or anodized aluminum. Both are available in different alloys and can be marked with several of methods, like laser engraving or silk screen printing. Cost-effective applications often use polycarbonate or polyester synthetics, the well known overlay material for membrane switches.

The rear side mounted circuit board carries the microcontroller, any additional components required for the application as well as copper sensor fields. A finger press increases the capacitance of the sensor and reduces the average voltage. mTouch technology monitors that, evaluates the plausibility and finally confirms a human’s touch.

Metal + mTouch + Illumination = metalLight. metalLight combines high quality metal surfaces with illuminated symbols including touch switch functionality. A new printing and sputtering method allows laser-cut or etched symbols to be filled with transparent or pigmented plastics. This material assures a uniform and bright illumination of even very small symbols. A very special feature of metalLight is the possible combination of different plastics and LED colors, which offers an infinite variance of illumination!

Demonstration units are available soon!

Features
- Customized icon design
- Easy to clean surface, sterile and no moving parts
- High impact resistance and temperature stability

For more information on Microchip’s mTouch Technology, visit: www.microchip.com/mtouch

DEMMEL AG is the leader in the business fields of decoration, identification and communication. Starting from the former core field of the manufacture of industrial labels the company has taken advantage by being a leader in the decorative design of metal and plastic material touch surfaces. Today, the company is successfully positioned in additional business fields, i.e., keyboards, input systems and decorative ornamental items, in particular for use in the automobile industry, medical devices, home appliances and industrial applications.

For more information, please contact:
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Marcus.Riegger@demmel.de
www.demmel.de
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www.microchip.com  Microcontrollers • Digital Signal Controllers • Analog • Memory • Wireless
Electronic Design's Smart Grid Roundtable

The Smart Grid is without doubt a transformative technology that will change the way consumers deal with energy suppliers over the next ten years or so. At the heart of the Smart Grid is the smart meter, which extends all the way back to the electric utility on one side and all the electric appliances throughout the home on the other. There will come a day – and that day is soon – when appliances like refrigerators, air conditioners, washing machines, dryers, televisions and other electrical and electronic appliances will be imbued with “smarts” so that each can talk, via a home area network, to the smart meter and then to the electric utility.

But getting from here to there demands a great deal of engineering savvy. In this Smart Grid Roundtable, presented by Electronic Design, two of the leading companies in the Smart Grid space, Microchip and Freescale answer questions from a leading authority on the Smart Grid, Electronic Design’s power editor, Don Tuite, about all facets of the Smart Grid and where the U.S. and most other countries around the globe are headed in the near future. If you are working on the Smart Grid now or are planning to do so in the future, you won’t want to miss this roundtable presentation.

Who Should Attend This Event?

- Design engineers involved in designing the electronics that will interface with smart meters
- Design engineers involved with creating home networks that will carry information from smart appliances to the smart meter
- Engineering managers who want to understand some of the technical details and challenges behind the transition from today’s electrical grid to tomorrow’s Smart Grid

Register now for this live webinar

Energy Efficiency: Motor & Drives

Join Microchip’s Charlie Ice, Product Marketing Manager, as he participates in the online webinar "Energy and Efficiency in Motors and Drives" which looks at the changes that have occurred in recent years. Plants are much more concerned these days about energy consumption. For one, energy efficient equipment sends savings to the bottom line. In addition to the positive value of savings from efficiency, plants are also concerned about their carbon footprint. For most companies, the reduction in energy consumption has become an overriding goal. Efficient motors and drives contribute to the goal.

Design News Senior Editor for Automation and Control Rob Spiegel hosts a webinar panel discussion featuring senior industry experts, including Charlie Ice.

Register online at: https://event.on24.com

Motor, Drive & Automation Systems

March 13-14, Orlando FL

Join Microchip’s Patrick Heath, Senior Manager, Strategic Marketing, as he presents “New Motor Controllers Lead the Way With Analog Circuit Integration”. Implementing sensorless motor-control algorithms requires measuring the phase currents from a three-phase motor. Currently, this is accomplished using shunt resistors and operational amplifiers (op amps) in circuits that are external to the Digital Signal Controller (DSC) or microcontroller (MCU) that is running the sensorless motor-control algorithms. Analog circuits such as op amps and analog comparators are now often integrated onto the DSC or MCU. This presentation will survey op-amp integration, and investigate the resultant motor-control-system cost impact and tradeoffs, along with other integration choices, such as integrated power modules.

Register online at: http://www.e-driveonline.com

Register for one or more of these great events at the links above!
Looking to Enhance Your Embedded Control Designs?

In tough economic times, companies often look for ways to trim expenses as a means to cope with a downturn in sales. One of the areas often targeted for cutbacks is employee training. There is not only the direct cost of the training to contend with, but also travel expenses and time an employee spends away from the job. During this challenging business climate, however, competitive pressures and technology changes don’t stop and it is training that can help a company be better positioned to take advantage of the potential upswing.

Microchip, with its global network of Regional Training Centers (RTCs) and third-party training partners, is here to help companies stay competitive with cost-effective, local training. To help companies deal with issues of travel expense and time, classes are given not only in Microchip’s facilities, but are also taken on the road. Customized customer premise sessions can be scheduled offering the most convenience. Time away can be managed more efficiently with the flexibility of half or full day class sessions.

To be effective in teaching, instruction must take into account the needs and expertise level of the attendee. Microchip’s Regional Training Center classes are developed to provide a coordinated flow, enabling engineers to implement a solution to their product development needs. Instruction is developed and presented in product, technology and implementation classes that are grouped into application based curriculum.

Each curriculum flow enables the individual to engage with the training at a level that meets his or her current knowledge and needs. The intent is to provide training that is relevant to each attendee while eliminating the frustration often associated with attending classes that present too much known information or assume a level of knowledge beyond what the attendee currently possesses.

Product/tool classes provide knowledge on how Microchip’s products and development tools operate. This knowledge provides the foundation upon which all application instruction is based. Attendance at one of these classes can provide significant value through the reduction in time associated with instruction manuals and data sheet review or trial and error attempts to learn individually. Market forces constantly press companies to add functionality and features to their products often outside their areas of core competence. As a result, engineers must continually broaden their knowledge base. Microchip’s technology classes are intended to help engineers gain an understanding of a new field.

Implementation classes combine elements of product and technology instruction to teach engineers how to design a real world application. Classes at this level provide how-to instruction rather than what or why instruction.

Microchip is currently offering classes in the following curriculum: DSP, Ethernet, Human Interface, Motor Control, Power Management, Signal Chain, System Design and USB. Future curriculum is expected to include CAN/LIN, IrDA®, Lighting and RF.

With a worldwide network of Regional Training Centers and certified third-party trainers, Microchip makes it easy to enhance your technical skills, with locations in nearly every metropolitan area across the world!

For those organizations who desire to have a number of employees attend a course at the same time, Microchip can customize any curriculum to meet your specific needs. Our instructors arrive at your location with all presentation materials and equipment, making it easy for your whole team to benefit from a specific course topic in one setting. In addition to the instruction, most Regional Training Center classes offer the opportunity to purchase a set of the development tools used in the class at a discounted price.

If the class you are interested in is not scheduled in your area, you can sign up to receive an alert when a session is scheduled.

For information on scheduling custom in-house training, contact your local RTC directly or visit the Microchip RTC web site: www.microchip.com/RTC
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microchipDIRECT Now Makes It Easier To Find Third-Party and Academic-Friendly Development Tools!

Two new categories have been added to www.microchipDIRECT.com making it easier to find third-party development tools that complement Microchip's solutions and low-cost, academic-friendly tools for educators and students. How to access the new categories:

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